

METEORS, THE BARRAGE FIRE FROM THE SKIES

By BOYDEN SPARKES

Illustration by Albert Levering

THE people of Tidewater Virginia were enormously disturbed on the night of May 11 by a meteorite that swept leisurely across their skies leaving a wake of orange-colored fire, as though some giant dwelling in space had flicked a cigarette butt into our universe.

Just before it was due to smash out of existence the major portion of the population of Blackstone, Va., there was a frightful report, as if all the thunderclaps of an entire summer had sounded together. The meteorite had exploded, its mass shattered into particles that fell harmlessly to the earth. Since the beginning of history there has been no recorded instance of a human being or other animal being struck down by an observed fall of a meteorite. Religious-minded persons might be inclined to attribute this to Divine Will, but more earthly-minded persons, such as insurance actuaries, possessed of the statistics applicable to the problem, would be more likely to lay it to the law of averages. As a matter of fact, Lloyds of London, who will cheerfully insure a prospective parent against twins, might be expected to write a million-dollar accident policy against this form of death and not charge more than ten cents annually plus the cost of the paper and ink in the receipt. But, even so, some one, some day, somewhere, is going to gain distinction through that form of extinction—that is if there is enough of his spirit left after the encounter to send a ouija-board message to the Missing Persons' Bureau.



Huge crater of Meteorite Mountain, Arizona

According to Professor Edmund Otis Hovey, curator of geology at the American Museum of Natural History, there are records of only about 685 meteorites which are represented in museums and private cabinets. Others are imbedded in the earth, of course, but they never have been found. Contrasted with this limited number is the estimate of astronomers and other scientists that between ten and a hundred million meteorites enter the atmosphere of the earth every day and through cremation by friction against the air are disposed of as effectively as dust that is absorbed by a vacuum cleaner.

In the recently published "Outline of Science," edited by J. Arthur Thompson, it is said that meteorites in so-called "empty space" swarm like fishes in the sea. Like the fishes, moreover, they may be solitary or gregarious. The solitary bit of cosmic rubbish is the meteorite. A "social" group of meteorites is the essential part of a comet. The nucleus, or bright central part of the head of a comet, consists of a swarm, sometimes thousands of miles wide, of these pieces of iron or stone. This swarm has come under the sun's gravitational influence, and is forced to travel round it. From some dark region of space it has moved slowly into our system. It is not then a comet for it has no tail. But as the crowded meteorites approach the sun the speed increases.

They give off fire vapor-like matter and the fierce flood of light from the sun sweeps this vapor out into an ever lengthening tail. Whatever way the comet is traveling the tail always points away from the sun. Prof. Chamberlain, one of the most widely quoted students of infinity, once wrote that "meteorites have rather the characteristics of the wreckage of some earlier organization than of the percentage of our planetary system." Which is a scientific manner of saying that he believes the ether to be choked with the remnants of exploded worlds rather than that the planets of this little corner of the universe that is called the solar system grew, as a tiny snowball started downhill grows, by accretion. Those craters on the moon revealed even by the telescopes that are rated at five cents a look by the street-corner astronomers who own them may have been made by meteorites splashing into the surface of our relatively near planetary neighbor, although there are other theories to account for these broken, bubble-like markings. But this much scientists can tell us: the reason the earth is not pitted with millions and millions of projectiles from the outermost ends of space is that cushion of air that envelopes it.

Our Atmosphere Saves Us The Trouble of Dodging

Some three hundred miles ahead of the earth as she spins along on her orbit, meteorites in the pathway enter the atmosphere. The effect is much like drawing the head of a match along a rough surface. When a meteorite of sufficient size is within eighty miles of the surface of the earth, it normally—on the side away from the sun—night time—becomes visible as a "shooting star." Millions and millions of them, of course, are so small they do not flash sufficient light to attract the attention of those other bits of cosmic dust commonly spoken of as mankind. When the light of a "shooting star" seems to go out, that is usually the point where the fused and fiery surface of the mass and its cold heart have put such a strain on its structure that there is an explosion of its parts. But for the working of that natural law, life on earth would be like experiencing a Brobdingnagian and unending artillery barrage.

Meteorites, according to Professor Hovey, are generally divided into three classes according to their mineral composition. First there are "siderites," or iron meteorites, com-

posed principally of an alloy of iron and nickel. Second, there are "siderolites," or ironstone meteorites. These are a nickel sponge or mesh, the interstices filled with stony substance. Third, there are "aerolites" or stone meteorites, but which nevertheless usually have grains of iron and nickel scattered in their mass.

These are the substances that have been found in meteorites which are also found in the earth: nickel-iron, olivine, chrysolite, pyroxenes, feldspar, diamond, graphite, hydrocarbons, cohenite, pyrrhotite, tridymite, chromite, magnetite, osbornite, lawrencite and glass.

But certain other substances have been found in these bodies that have never been encountered elsewhere in the earth. These have been named maskelynite, schreibersite, moissanite, troilite, daubreelite and oldhamite, each substance, obviously, taking the name of its discoverer. It is these new substances that give the constantly waged search for new meteoric bodies such a glamor of fascination. A scientist is always lured to make further investigations by the hope that sometime he will encounter a substance, perhaps a philosopher's stone, that may explain our very existence, and the lay mind, at least, likes to toy with the idea that there may turn up the fossilized remains of some form of life that has existed elsewhere than here on earth.

The heaviest weighing meteoric mass known to have landed on earth is Ahnighito, an iron meteorite weighing more than thirty-six and a half tons, which was brought from Cape York, Greenland, by Admiral Robert E. Perry. In the same "fall" were two other heavy bodies that were named by the natives who discovered them "the dog" and "the woman." For generations these metal masses furnished the Greenlanders with material for their knives and other hunting weapons. All three of these are to be seen in the foyer of the American Museum of Natural History.

A Meteor Heavy Enough To Shatter a Skyscraper

Ahnighito, or the "tent" to employ the English equivalent, had it reached earth this year instead of ten thousand or more years might have shattered the Woolworth Building or sunk the Majestic "spurious versenkt."

When it was suggested to Professor Hovey recently that meteorites offer a reasonable explanation of the failure of some ships to reach port he was at first amused and skeptical, but then he sobered and agreed:

"It might happen. It might happen, true enough."

Strangely enough meteorites have a favorite alighting place in North America, and it is more than likely that there are acres of the ocean that exert an attraction for these wanderers equal to this region of the southern Appalachians, where the states of Kentucky, Virginia, Tennessee, North Carolina, Georgia and Alabama adjoin. A circle with a radius of 300 miles drawn about Mt. Mitchell, North Carolina, as a center will include nearly half of the known meteorites of North America. Twenty-five of these, or nearly half of the known "falls" of the continent, are observed "falls," and it would seem possible at first that many of the meteorites in this area might have come from a single shower. This would reduce the number, but the writer has made a careful study of the history of each meteorite and its geographic relation to those of similar character without finding any support for such a view. Not only does the area contain a large number of observed "falls," but the "finds" embrace a variety of types larger than any known to be produced by a single shower. As regards population in the area conditions are only moderately favorable, since the area is not very thickly settled. Meteorites are superabundant in this area. This seems to leave little doubt that some force tends to bring about their concentration here. It is noteworthy that this region includes the highest summits of the Appalachians, and this suggests either the presence of an extra gravitational force or that a purely obstructive effect has been exerted by the high peaks. Studies of the gravitational effects of mountain masses indicate no force seemingly sufficient to affect the fall of a meteorite, though some such force may exist. Magnetic influences may also be suggested. Next to the massing of meteorites about the southern Appalachians (the Blackstone, Va., fall of May 11 may be included in this area by stretching the radius of a trifle), the most striking grouping seems to be within the borders of Kansas.

Meteorites nearly always take the name of the town nearest which they fall. Out in Ar-

izona, near Canyon Diablo, is Meteorite Mountain, and scientists expect that eventually there will be discovered there the largest meteorite that ever struck the earth. This so-called mountain is really a butte, 200 or 300 feet in height, rising from a plain. It is ten miles south of Canyon Diablo station on the Santa Fe Railroad. Climbing the rock-strewn sides of this interesting hill brings one to the edge of a bowl-shaped depression in the earth that is 600 feet deep and a mile across. Here, according to Indian tradition and the theory of scientists, a giant meteorite, as large in circumference as the rim of the bowl, struck the earth in ages past. The Moki Indians whose homes are near by, have kept alive for countless generations the story of the fall of a blazing star ages ago, appalling the savages who were dazzled by its fierce light and shaken by the trembling of the earth. If the theory of the scientists is correct, the great mass plunging itself into the earth forced up the edges of the crater just as embossings appear when a pebble is dropped into soft mud. Strata of rock were displaced and clouds of steaming dust and sand were sent into the air, only to fall back as a grave covering for the great body. A shaft more than 200 feet deep has been sunk into the center of the crater by a mining company that decided that profitable operations might be conducted if the main body of the meteorite could be reached. They pushed their work all the harder when it was discovered that iron fragments contained diamonds. There is still a vast amount of research work to be done at Canyon Diablo, and until it is finished none can say what cosmic secrets are hidden in that great dish.

New York State was the target for a meteorite just about the time the Civil War was brewing. The only portion of this heavenly visitor ever found is now in the possession of the state at Albany. It is a stone and weighs four ounces, though the parent body undoubtedly weighed a great many tons before it was consumed by fire or shattered by an explosion. This meteorite is known to scientists as "Bethlehem." The story of its encounter with the earth is preserved in one old account as follows:

"On the morning of August 11, 1859, at seven o'clock and twenty minutes or thereabouts, thermometer 73°, air still and the sun shining brightly, a meteoric body of great size and brilliance was observed throughout a large portion of western New England and Eastern New York, which, exploding violently, threw down to the earth at least one fragment of its mass in the vicinity of Albany, New York."

New York State Jarred By Meteor in 1859

"The main facts connected with this interesting phenomenon collected from numerous and widely separated observers are as follows:

"By observers, generally, north of Albany, the meteor is described as appearing in the southeast at an elevation of from 45° to 60°; thence it passed rapidly to the south and disappeared a little west of south at an elevation of from 10° to 15°. Its course throughout its visible range was marked by a heavy train or trail of smoke which continued visible for some time after the meteor itself had disappeared; and at two or three points in its course large volumes of smoke were observed to form as if the result of successive explosions."

"To observers, generally, south of Albany (20 miles or more distant) the meteor was first seen in the northeast and disappeared to the northwest; a fact which indicates the path of the body to have been nearly coincident with the parallel of Albany."

A few minutes after the disappearance of the meteor, the lapse of time being variously estimated by differently located observers at from 30 seconds to two minutes, two or three loud and successive explosions or reports were heard, accompanied by prolonged

echoes and a violent concussion. These sounds have been compared by some to sharp and heavy peals of thunder, to the report attending the explosion of a powder mill or steam boiler and also to the rumbling of heavy carriages on a bridge.

"The estimates formed of its size are exceedingly discrepant, some observers comparing it to the sun, or full moon, and others to a skyrocket or the luminous ball projected from a Roman candle. All agree, however, that its appearance, even in full sunshine, was exceedingly bright and dazzling, the light being at the same time of a reddish color. So bright, indeed, was it at Stafford, Vermont, a locality nearly 100 miles north of the probable point of explosion, that the distance was estimated at not exceeding one half mile from the point of observation."

A Meteor That Arrived In a Thunderclap

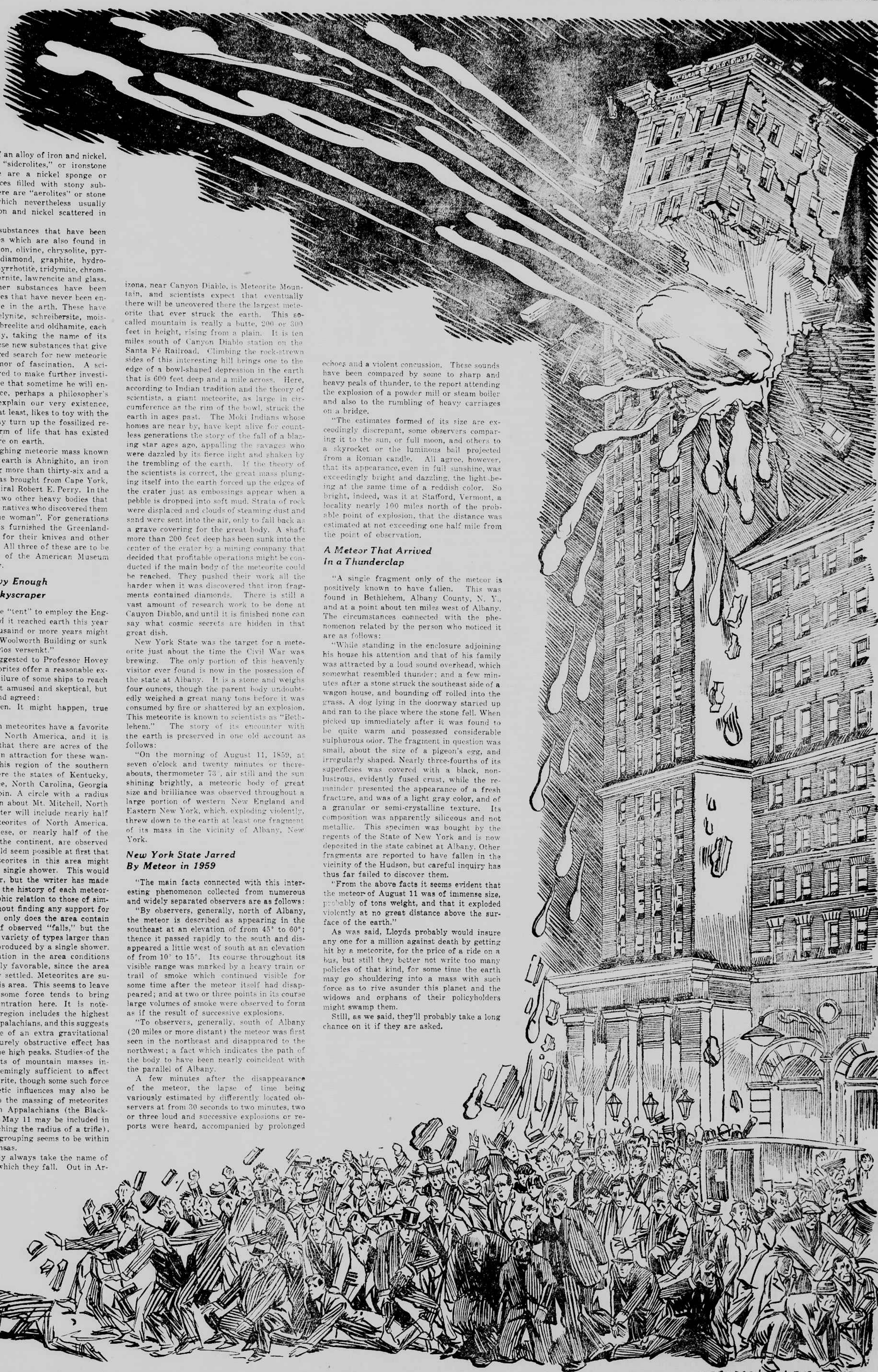
"A single fragment only of the meteor is positively known to have fallen. This was found in Bethlehem, Albany County, N. Y., and at a point about ten miles west of Albany. The circumstances connected with the phenomenon related by the person who noticed it are as follows:

"While standing in the enclosure adjoining his house his attention and that of his family was attracted by a loud sound overhead, which somewhat resembled thunder; and a few minutes after a stone struck the southeast side of a wagon house, and bounding off rolled into the grass. A dog lying in the doorway started up and ran to the place where the stone fell. When picked up immediately after it was found to be quite warm and possessed considerable sulphurous odor. The fragment in question was small, about the size of a pigeon's egg, and irregularly shaped. Nearly three-fourths of its superficies was covered with a black, non-lustrous, evidently fused crust, while the remainder presented the appearance of a fresh fracture, and was of a light gray color, and of a granular or semi-crystalline texture. Its composition was apparently siliceous and not metallic. This specimen was bought by the regents of the State of New York and is now deposited in the state cabinet at Albany. Other fragments are reported to have fallen in the vicinity of the Hudson, but careful inquiry has thus far failed to discover them."

"From the above facts it seems evident that the meteor of August 11 was of immense size, probably of tons weight, and that it exploded violently at no great distance above the surface of the earth."

As was said, Lloyds probably would insure any one for a million against death by getting hit by a meteorite, for the price of a ride on a bus, but still they better not write too many policies of that kind, for some time the earth may go shuddering into a mass with such force as to rive asunder this planet and the widows and orphans of their policyholders might swamp them.

Still, as we said, they'll probably take a long chance on it if they are asked.



It has never happened—giant meteors pick out desert wastes—but it might